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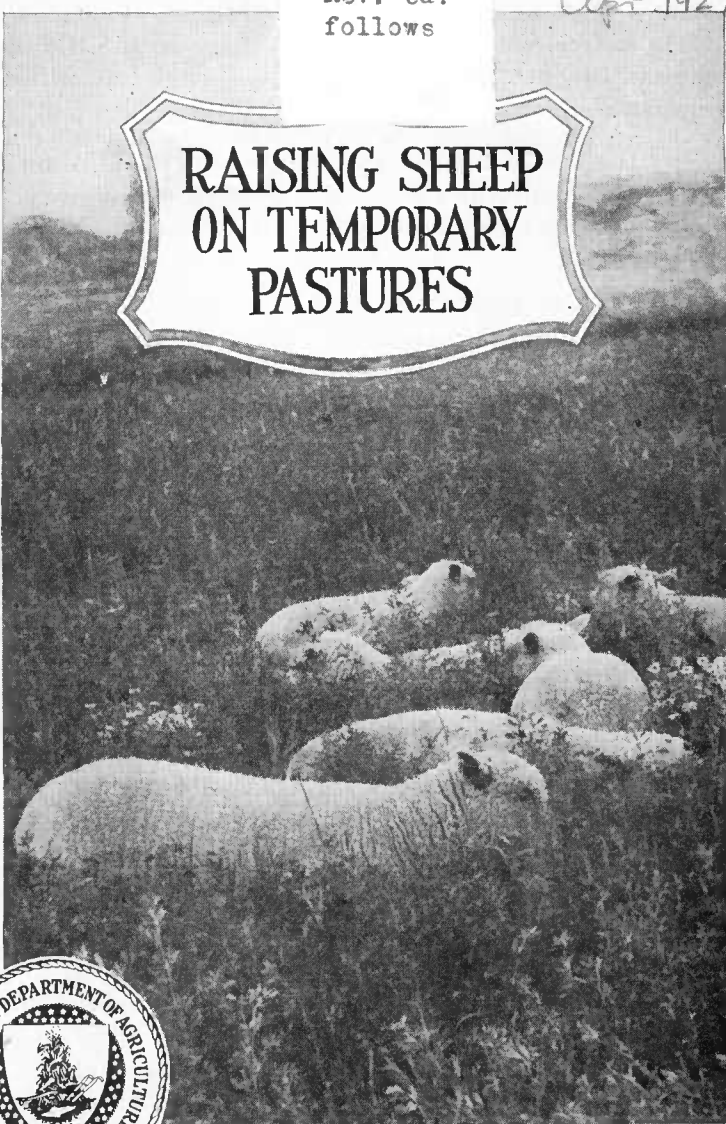
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## RAISING SHEEP ON TEMPORARY PASTURES



**T**EMPORARY pastures for sheep may be used for all or part of the grazing season. Their use makes it possible to fit the flock into the livestock farming system with very little change in the usual methods of producing feed and pasturage for cattle and swine.

By the use of temporary pastures the flockmaster is able to maintain a uniform milk flow of the ewes, which insures rapid development of the lambs to market size.

The use of temporary pastures assists greatly in the prevention of infection by stomach worms and other internal parasites. Frequent changes to new pasturage can be made and losses by death and lack of thrift prevented.

A system of temporary pastures for sheep raising permits the use of lands of low fertility and at the same time insures a revenue from them without an expensive outlay for commercial fertilizer. Only lime, phosphorus, and inoculating material are necessary to enable poor soils to produce legumes.

This bulletin explains the advantages and methods of using temporary pastures for sheep and gives results of experiments conducted at the Bureau of Animal Industry experiment farm, Beltsville, Md.

# RAISING SHEEP ON TEMPORARY PASTURES.

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## CROPS USED FOR TEMPORARY PASTURES.

**A**NY ANNUAL CROPS that are sown for the purpose of being pastured off before maturity are called temporary pastures.<sup>1</sup> They may be used as the sole pasture crop for all or for a part of the grazing season. In the experiments reported in this bulletin the experimental flock was grazed all the season without the use of permanent grass pasture. The crops were grazed off in the following order: Fall rye, fall wheat, alfalfa, spring-sown oats and peas, rape, cowpeas, soy beans, fall barley, and fall wheat.

In many localities fall wheat or rye is grazed during winter and early spring and then allowed to mature a grain crop. The same practice is possible with spring-sown cereals, but is less often practicable with cowpeas and soy beans. The temporary pasture crops suitable for sheep are equally valuable for hogs. In case a crop is to be used for both kinds of stock the feed should be kept fresh for the sheep, either by dividing the field or having the hogs follow the sheep.

Surplus cereal and legume crops from the pastures can be cured into first-class winter roughage for sheep.

NOTE.—R. B. Millin, formerly employed by the Bureau of Animal Industry, assisted in the early development of the experiments reported in this bulletin.

<sup>1</sup> The occasional pasturing of a permanent crop like alfalfa is also employed in a system of temporary pastures.

## ADVANTAGES OF TEMPORARY PASTURES.

The use of temporary pastures aids in utilizing the economic peculiarities of sheep. This is true because a succession and a variety of fresh forage crops produce the maximum milk flow of the ewe, and lambs are largely a milk product. The lambs most in demand at the markets are those that reach a desirable weight and finish while still sucklings. Returns from the sale of such lambs are the quickest that can be obtained for a finished product in any line of livestock raising.

Permanent grass pastures are well suited to ewes with lambs, but as the lambs become larger and able to use more milk the feed is likely to be cut short by dry weather. Special seedings of annual crops at different dates give greater assurance of good milk-producing pasture when most needed. In most parts of the country, however, lambs can be marketed best before the usual date of dry weather.

On most high-priced lands a ewe's feed can be produced more cheaply from annual crops sown to be grazed than on permanent grass pasture. The extent to which the extra amount and value of the forage crop will offset the extra costs of fencing, plowing, and seeding depends upon the value of the land.

## AID IN CONTROL OF PARASITES.

An aid in controlling the ravages of stomach worms and other internal parasites is one of the advantages to be obtained by using temporary pastures for sheep. Losses by death or lack of thrift are most serious among lambs of flocks that are kept season after season on old grasslands. With only a few sheep on a large area of grass which is also pastured by other stock, the danger is less likely to be serious. With closer grazing by sheep during several months of each season the danger is increased and is most serious in sections or in seasons of high temperature and excessive moisture. Alternating permanent pastures during the season does not materially lessen the danger.

Though rotation of temporary pastures is a useful aid in diminishing the ravages of stomach worms, the plan requires that the flock does not go on a field a second time unless the land has been plowed in the interim or time enough has elapsed to cause the death of the stomach-worm larvæ that are left upon the field grazed by infected sheep.<sup>2</sup>

On farms provided with a large number of fields with fences suitable for sheep, a succession of clean temporary pastures can be

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<sup>2</sup> Farmers' Bulletin 1330, "Parasites and Parasitic Diseases of Sheep."

provided. In most cases it is more economical and more satisfactory to provide permanent or movable fences for a number of smaller pasture lots, on each of which two or three crops can be grown each season to a stage suitable for grazing. On larger lots a system of hurdles can be used to permit access to a portion furnishing only 1 or 2 days' feed. It is more satisfactory to have lots of a size to furnish from 10 to 14 days' feed for the flock. Two weeks is the longest time that one piece of ground should be used during the warmer part of the season. Young lambs are most susceptible to injury from parasites, and are exposed to less danger when moved to fresh ground at intervals of not more than 2 weeks than when permitted to remain longer on the same fields.

#### IMPROVEMENT OF SOIL.

An additional advantage in using temporary pastures for sheep raising is the improvement of the soil. The greatest demand upon fertility is avoided by not requiring the crops to mature seed. All the manure is distributed upon the ground together with all uneaten parts of the crop. With legume forages the gain to soil is especially valuable and allows production of still larger crops which are again returned to the land diminished only by the materials contained in the increased size of lambs or ewes while on that particular crop.

#### RESULTS OF EXPERIMENTS WITH TEMPORARY PASTURES.

A study of the possibilities of sheep raising under a temporary pasture system was begun in 1916, when a field of 30 acres at the Bureau of Animal Industry's experiment farm at Beltsville, Md., was set aside to be used exclusively for sheep. The objects and results of the experiment relate to amount and value of pasturage; carrying capacity and value of various crops; health of sheep; size of lots and methods of fencing and grazing; effect on the land.

#### AMOUNT AND VALUE OF PASTURAGE.

On the 30-acre field used in this experiment sufficient pasturage was produced to furnish an average of 505 days' grazing on each acre for a mature ewe. This is equivalent to about 2 sheep an acre for a season of 250 days, or  $2\frac{1}{2}$  sheep for a 200-day period. This pasturage is much more than could be obtained from perennial grass grown on land of the character and value of that used in the experiment, but not more than can be obtained from the best blue-grass pastures. Good land used for such a succession of temporary pastures should produce from 50 to 100 per cent more pasturage than was obtained in this instance.

In a system like this there is not much choice of crops to be used in different months. It is chiefly necessary to make sure of having one

crop ready when the preceding one is finished. All the crops used in 1919 stimulated a good flow of milk in the ewes, produced good growth in the lambs, and, after weaning, put the ewes in good condition for fall breeding.

The ewes and lambs were all purebred Southdowns. Some of the ewes raising lambs received a half pound of grain each daily until May 10, and 22 head of ewes in a fall breeding experiment received a light feed of grain during September and October. All the lambs were kept for breeding purposes and were fed some grain throughout the summer. In calculating how far the feed actually produced would go for grown sheep it was considered that a lamb ate one-

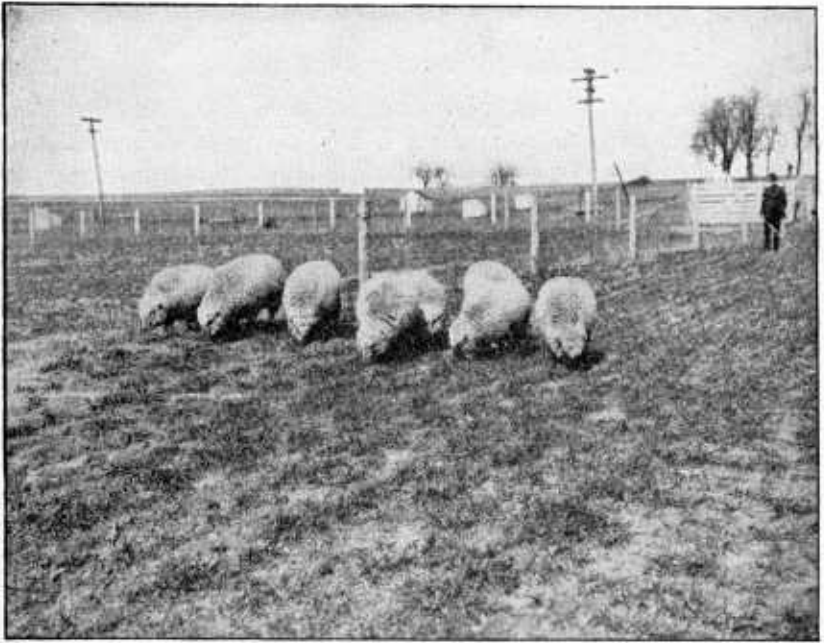


FIG. 1.—Wheat is a very satisfactory spring forage. Yearling ewes on wheat at Beltsville, Md., March 16, 1917.

fourth as much as a sheep until July 1, and after that one-half as much. Putting in the crops used in 1919 required 60 acres of plowing and seeding, a total of 520 hours' work for a man and a team.

Under the conditions of this experiment fall-sown wheat and spring seedings of oats and peas<sup>3</sup> have been most satisfactory for grazing in spring and early summer. Soy beans are ready for grazing about the middle of July and furnish most of the feed until October. In November fall-sown wheat and rye have been used most, though late seedings of corn and velvet beans were used in 1919. The land is still too poor for rape, a good stand having been

<sup>3</sup> Oats and field peas, sown together at the rate of  $1\frac{1}{2}$  bushels of each per acre.

secured in 1919 for the first time on  $1\frac{1}{2}$  acres that had received an extra coating of manure.

Two crops were grown in 1919 on each forage lot. In the latitude of southern Maryland three crops can be raised on one-third the area where the land is used in the manner described.

#### CARRYING CAPACITY AND USE OF VARIOUS CROPS.

The number of days of grazing from 1 acre of each crop in 1919 was as follows, calculated on its pasture value for one mature ewe.

	Days.		Days.
Rape -----	392	Cowpeas -----	210
Soy beans -----	319	Alfalfa -----	882
Oats and peas -----	319	Barley -----	278
Wheat -----	309	Rye -----	180

Pasturing on wheat and rye began at the same time, April 8. The wheat continued to be suitable for use until the first week in



FIG. 2.—Lambs in alfalfa, Beltsville, Md., July 7, 1917.

May. A second growth was grazed later by a bunch of yearling ewes. Rye is not relished by the sheep so much as wheat, and heads out more quickly. In this stage sheep do not eat either leaves or heads to the same extent that they eat wheat.

Rye is especially valuable for winter grazing in the Southern States. In winter-wheat sections that crop is grazed in winter and part of the spring with great advantage to the animals and to the grain crop as well.

Alfalfa was used in May and again, for ewes, in October. This crop does not fit well in a temporary pasture system on account of the likelihood of larvæ left on the ground at one grazing infecting sheep at a later grazing. Cutting one crop for hay before the second

grazing may reduce this danger, but does not wholly overcome it. Any such risk from feeding the cured hay would be slight.

Oats and peas grown together furnish most of the grazing, after using the wheat, until rape and soy beans are ready. The oats and peas may be sown early, and seedings at different dates insure later pasturage that is still succulent and tender. Our first seeding of the crop in 1919 was on April 6, and it was ready for grazing on May 28.

Rape, as stated, has not been largely used on the land described, because of the low fertility of the soil. The crop of 1919 was planted on April 10 and required 10 weeks to be ready for pasturage. Plantings made in warmer weather should grow more rapidly, but in mid-summer rape becomes bitter and is not relished so much as earlier. On rich land rape can be the main forage crop from the time the



FIG. 3.—Ewes and lambs in rape, Beltsville, Md., June 20, 1917.

first seeding is ready for use. Well-grown plants withstand a good deal of frost, and the crop should be useful for extending the grazing season late into the fall. Lambs require several days to learn to eat rape readily, and it is an advantage if they can spend a few hours each day on some other crop until they have learned to like rape. Bloating rarely occurs in sheep pasturing on rape, but it is well to see them frequently during the first few days on this crop or in frosty weather. Rape ordinarily yields better and is grazed with less waste when planted in drills.

Soy beans in the 1919 rotation of forages were planted from June 11 to August 4. Pasturing of the earliest planting was begun one month after seeding, though it is usually desirable to allow 5 or 6 weeks between seeding and grazing. This particular crop of 3 acres carried 66 lambs for 14 days in July and then 70 ewes for another 9

days. After 25 days there was new growth enough to carry 35 ewes for 18 days. This feature of making new growth after being grazed is a valuable one in soy beans, and sheep and lambs eat the crop with great relish.

Cowpeas are planted at the same time as soy beans and grow at about the same rate. They produce feed similar in amount to that obtained from soy beans, but are less palatable for lambs, and the crop does not make so much of a second growth as do soy beans. The arrangement of the fields used in this experiment, the order of seeding and grazing the crops, and the amount of pasturage produced are shown in the map of the field in figure 6.



FIG. 4.—Lambs in soy beans, Beltsville, Md., July 10, 1917.

#### HEALTH OF SHEEP.

A reduction of injury by internal parasites is an advantage of providing temporary pastures for sheep under a plan that allows their going to fresh ground at intervals of not more than 2 weeks. It is considered that most flocks have some degree of infection of stomach worms. In warm, moist weather the eggs in the droppings of the older sheep develop in a few days into larvæ, which are especially injurious when taken up by lambs. These larvæ are largely destroyed when land is plowed, and it is for this reason that plowing is recommended in reseeded land after a crop has been pastured.

Older sheep are less susceptible than lambs to the effects of stomach worms. There is less danger in allowing them to remain longer than 2 weeks on the same ground or in using up feed left in fields from which lambs have been removed. Because of the continued chance of infection of lambs from grass along fence rows and in unplowed

yards and barn lots complete freedom from parasites is seldom obtained.

In pasturing ewes and lambs in the experiments herein reported stomach worms have not been found, except in a few cases in August and September, and these were overcome by giving the copper-sulphate treatment. In flocks changed to fresh ground every 2 weeks treatment would seldom be needed for lambs marketed in May and June. Temporary pastures on clean land are particularly useful for ewe lambs retained as breeders, though treatment for parasites would probably be advisable and may safely be used as a precautionary measure.<sup>4</sup>

The order in which various crops were used and the length of time spent upon each is shown below for the flock containing the young lambs and for the lambs alone after the time of weaning.

*Order of grazing flock of ewes and lambs followed by lambs alone in experimental work.*

Date.	Crop.	Field No.	Acres in field.	Number of lambs.	Number of ewes.
1919.					
Apr. 8 to 19.	Fall wheat	3	3	52	44
Apr. 20 to 26.	Rye.	6	3	52	44
Apr. 27 to May 8.	Wheat	4	5.3	66	58
May 9 to 27.	Alfalfa.	8	2	66	58
May 28 to June 10.	Oats and peas.	5	5.8	66	56
June 11 to 17.	do.	(1)	3.7	66	56
June 18 to July 1.	do.	(2)		64	15
July 2 to 12.	Rape.	1	3	66	
July 13 to 25.	Soy beans.	2	3	66	
July 26 to Sept. 11.	do.	3	3	62	
Sept. 12 to Oct. 10.	do.	6	3	(3)	
Oct. 11 to 25.	Corn and velvet beans.	9	2	59	
Oct. 26 to Nov. 5.	Fall barley.	5	5.8	(3)	
Nov. 5 to 25.	Fall wheat.	2 and 10	9	(3)	

<sup>1</sup> Part of 10.

<sup>2</sup> Other part of 10.

<sup>3</sup> Not grazed.

From April 17 to June 18, 14 dry and yearling ewes followed the ewes-and-lambs flock.

After July 2, the 70 ewes followed the lambs and also grazed Field 10, 3.7 acres soy beans, and Field 4, 5.3 acres corn and soy beans.

#### SIZE OF LOTS AND METHODS OF FENCING AND GRAZING.

The convenient size for temporary pasture lots is determined mainly by the size of the flock. For health and for economical use of the pasturage it is undesirable to keep sheep on the same ground more than from 10 to 14 days. A useful size of lot is 1 acre to 25 sheep. This area on an average furnished 14 days' feed.

Arranging the size of lots on the basis of 1 acre to 25 sheep is more satisfactory than seeding larger areas and using hurdles to permit advance to fresh feed each day. Less labor is necessary and by going to entirely new ground after 10 or 12 days the danger of picking up parasite larvæ on ground grazed over earlier is prevented. With a

<sup>4</sup> Medicinal treatment for stomach worms is described in Farmers' Bulletin 1330.

1-acre lot for 25 ewes or correspondingly larger ones for larger flocks it is an added advantage if the length is two or three times the breadth. With a heavy crop of forage that would last longer than was considered safe to hold the flock on the same ground, a short piece of cross fence can readily be put down to divide the pasture into two parts. The smaller lots are also convenient with purebred flocks to provide for separate pasturing of smaller lots of ram and ewe lambs.

Movable fencing is not likely to be satisfactory for the outside-lot fences unless the whole area to be used lies in a long strip with side fences, when only two end pieces need to be in place at one time for the ground being grazed.

A handy style of movable fence consists of a roll of 32-inch woven wire supported by posts made of half-inch iron rods. This post is known as the Illinois post.<sup>5</sup> Eight inches from the foot there is a branch at right angles to the post. This branch runs out 6 or 8 inches and turns downward parallel with the post itself. This post can be set readily by pressing on the branch with the foot. The shape of the bottom part gives bracing enough to prevent pushing over by the sheep. The bottom of the fence is kept in place by passing the post between two of the lower wires. The top wire lies in a groove made in the top of the post.

#### EFFECT ON THE LAND.

An increase of 100 per cent in the amount of pasturage produced has been obtained during four years' use of 30 acres of land for temporary pasture experiments described in this bulletin. In 1916 this 30-acre field used exclusively in growing temporary pasture crops grazed by sheep carried 6 yearling ewes and 22 2-year-old ewes with 24 lambs. They were in rather low condition at the close of the pasture season. In 1919 the same land furnished good grazing for 70 ewes and 66 lambs for 200 days and a considerable quantity of unused feed was plowed under.

This field is a low-lying, flat piece of land decidedly below average fertility. The results obtained are far below what would be secured on many farms, and demonstrate the advantages and general style of practicing such a system rather than maximum quantity of feed which can be produced. The soil is a heavy, silty clay, parts of which, even after tile draining, are at times too wet for plowing in summer. It had been badly run down by cropping without manure, as is shown by the poor returns in 1916, a season of average rainfall. Improvement in soil condition has been due to the manure left distributed upon the land by the sheep, to the plowing in of unused

<sup>5</sup> The Illinois post and other kinds of equipment for sheep raisers are illustrated and described in *Farmers' Bulletin* 810, "Equipment for Farm Sheep Raising."

parts of crops, and to other beneficial effects of legume crops, soy beans in particular. In order to get satisfactory crops of cowpeas and soy beans 40 tons of ground limestone and 2 tons of acid phosphate in all were applied to 25 acres of the field in the fall of 1916 and in 1917. During the three seasons 1918 to 1920, inclusive, 15 acres also received a single application of manure at the rate of 10 tons of fresh manure per acre.

The soil is too heavy to be benefited by trampling; in fact, holding the sheep on the lots in wet times has had a harmful effect. The sheep were kept night and day upon the crop in use without access to any other pasturage. Shade and water were provided in each lot.

### FORAGE ROTATIONS FOR DIFFERENT SECTIONS.

Although the crops described seem best adapted to the section near Washington, in which the farm is situated, it does not follow that they would be best for sections in which climatic conditions are very dissimilar. For instance, in New York and the New England States, rye, oats and field peas, and rape should form the principal part of the rotation, with alfalfa or permanent pasture to fill the gap between rye and oats and field peas, the last two being grown together. Plantings of rape following both of the crops would furnish feed in the autumn as long as the sheep could be left out.

In the South Atlantic and Gulf Coast States a greater variety of forage crops is available. The following table indicates groups from which selection could be made, together with the months which they would be most desirable for sheep pasture.

Group.	Crops.	Time available for pasturing.
1	Wheat, oats, rye, Italian rye grass, or rape .....	Jan. 1 to Apr. 30.
12	Lespedeza, Bermuda grass, carpet grass, ripe oats, alfalfa.....	Mar. 1 to June 30.
3	Early varieties of soy beans and cowpeas.....	June 1 to July 30.
4	Late varieties of soy beans, cowpeas, velvet beans, sorghum and millet.	July 1 to Nov. 30.
5	Winter rye, oats, barley, wheat, and rape.....	Oct. 15 to Dec. 31.

<sup>1</sup> Group 2 could be cut later for hay.

Group 2 consists of meadow or permanent pasture plants which could be pastured for a few weeks each spring without danger of serious infection from stomach worms. The choice of the crops from each of these groups should depend upon the degree of success with which they are grown in any particular section.

Supplementary literature may be found in the following Farmers' Bulletins: 690, Field Peas as a Forage Crop; 756, Rye Culture in Eastern States; 892, Spring Oat Production; 973, Soy Bean: Its Culture and Uses; 1021, Alfalfa on Corn-Belt Farms; 1148, Culture and Variety of Cowpeas; 1276, The Velvet Bean; 1283, How to Grow Alfalfa.

<b>FIELD 1.-3 ACRES</b> <b>RAPE</b> 69 ewes } June 18 to 28 14 lambs } 66 lambs } July 2 to 12 70 ewes } July 12 to 16  <b>MILLET</b> 25 ewes } Aug. 29 to Sept. 6 13 ewes } Sept. 13 to Oct. 20	<b>FIELD 10.-3.7 ACRES</b> <b>OATS AND PEAS</b> 56 ewes } June 11 66 lambs } to 17 15 ewes } June 18 64 lambs } to July 1 70 ewes } July 2 to 6 <b>SOY BEANS</b> 34 ewes } Sept. 15 to Oct. 8 30 ewes } Nov. 10 to 24.	<b>FIELD 9.-2 ACRES</b> <b>COW PEAS</b> 70 ewes } July 7 to 12 <b>CORN AND</b> <b>VELVET</b> <b>BEANS</b> 59 lambs } Oct. 11 to 25 33 ewes } Oct. 29 to Nov. 5	<b>FIELD 8.-2 ACRES</b> <b>ALFALFA</b> 58 ewes } May 9 66 lambs } to 27 <b>ALFALFA</b> 25 ewes } Sept. 6 to Oct. 10
<b>FIELD 2.-3 ACRES</b> <b>SOY BEANS</b> 66 lambs } July 12 to 26 70 ewes } July 26 to Aug. 4 35 ewes } Aug. 29 to Sept. 15  <b>WHEAT</b> 24 lambs } Nov. 4 to 25	<b>FIELD 7.-2 ACRES</b> <b>RYE</b> 9 ewes } 11 yearlings } Apr. 8 to 14 9 ewes } 9 yearlings } Apr. 14 to 21 7 ewes } 9 yearlings } Apr. 21 to 27		
<b>FIELD 3.-3 ACRES.</b> <b>WHEAT</b> 44 ewes } April 7 to 20 52 lambs } 15 ewes } April 27 to May 21 <b>SOY BEANS</b> 62 lambs } July 26 to Sept. 1 35 ewes } Sept. 2 to 14	<b>FIELD 6.-3 ACRES</b> <b>RYE</b> 12 ewes } 9 lambs } April 11 to 26 44 ewes } 52 lambs } April 21 to 27 14 ewes } May 20 to 27 <b>SOY BEANS</b> 60 lambs } Sept. 11 to Oct. 10 26 ewes } Oct. 11 to 15		
<b>FIELD 4.-5.3 ACRES</b> <b>WHEAT</b> 58 ewes } April 27 to May 8 66 lambs } 14 ewes } May 28 to June 17 69 ewes } June 27 to July 1 <b>CORN AND SOY BEANS</b> 33 ewes } Oct. 9 to 29	<b>FIELD 5.-5.8 ACRES</b> <b>OATS AND PEAS</b> 58 ewes } 66 lambs } May 28 to June 10 70 ewes } July 16 to 26 <b>BARLEY</b> 26 ewes } Oct. 15 to 27 54 lambs } Oct. 25 to Nov. 6.		

FIG. 5.—Diagram showing the rotation of crops and the amount of grazing afforded by each field on the specialized sheep farm at Beltsville, Md., 1919.

## **ROTATIONS WITH PERMANENT PASTURES, STUBBLE FIELDS, AND TEMPORARY PASTURES.**

When it is not practicable to use a system of temporary pastures to provide the change of pasture necessary for protection from parasites, an effective system can be arranged in the regular crop fields of most stock farms, provided there is a sufficient number of fields having sheep fence. It is necessary that the lambs, and so far as possible the ewes, should be moved to new pasturage at intervals of not longer than 2 weeks without returning to any land that has not been plowed since it was grazed by sheep. In freezing weather these frequent changes are not required from a health point of view.

In a plan of providing a change of pastures in a stock-farm crop rotation, the earliest grazing is furnished by fall-sown wheat or rye. This can be used for 2 weeks in freezing weather even though the crop has been grazed previously during the winter. Following this, the flock is placed on permanent grass pasture upon which there were no sheep during the previous year. If the second, or grass pasture, free from infection, is not available, a red-clover crop is used. Ordinarily this would be the same land upon which the sheep grazed wheat at the beginning of the previous year. In most sections the danger of infection in such case would not be a serious one. By the time the third change is necessary some clover fields have usually been harvested for hay and the second growth can be used for grazing. At this time of year (early fall) on farms producing such crops as mentioned for other livestock, lambs will usually be marketed. The ewes, if necessary, can return to some of the same land previously used. This does not allow the same degree of protection from parasites as would exist if there were no pasturing the second time without intervening plowing, but the effects of the parasite are less serious in older sheep, and treatment can be given to those ewes that show the need of it, to prevent a serious setback.

For ewes or for lambs that are carried later in the year, later pasturage is furnished in the stubble fields of the grain crops, and after that from rape sown in the cornfields. At a still later time the early fall-sown grain furnishes pasturage until the coming winter.

One or two acres of rape or some other forage crop will usually be found desirable as an insurance against possible shortage of pasturage in other fields, and more particularly as a safe and satisfactory feed for ewe lambs retained for breeding, and which can not safely remain with the ewes, particularly if the latter are spending part of their time upon land that may be infected.

## **SPECIALIZED SHEEP FARMING.**

At present farms devoted mainly to sheep raising are not numerous. The opportunity exists for specializing in sheep raising with the same prospects of profit as are to be obtained from specializing in other lines of livestock production. In a plan of specialized sheep

raising larger reliance necessarily would be placed upon temporary pastures. The results of experiments reported in this bulletin demonstrate that with the rotation of grazing and plowing for re-seeding, land can be stocked heavily with sheep year after year without the development of serious difficulties. The necessary winter feed for a specialized sheep farm can be produced in connection with the regular temporary pastures. Extra seedings of leguminous crops can be harvested for hay, and in most seasons there is likely to be a part of some crop which is not needed for pasturing and can be cured for winter feeding. With the production of silage for a part of the roughage fed in winter the amount of land required is reduced to a minimum.

#### MOST SUITABLE SOILS.

Land suitable for a system of this kind should be level or only slightly rolling, and of a rather heavy soil texture in order that it

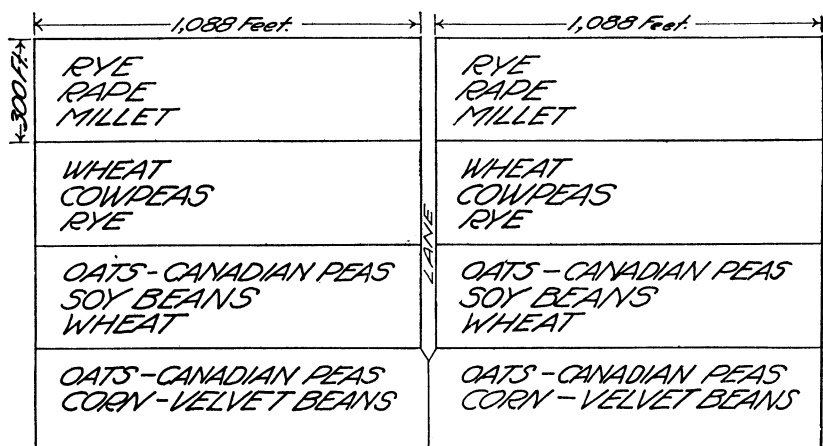


FIG. 6.—Diagram of a farm showing a practical rotation of crops for each field for Central Atlantic and Corn-Belt States.

will not wash readily with the plowing necessary to provide the maximum amount of pasturage and protection from parasites.

#### PROTECTION FROM DOGS.

One of the principal drawbacks to sheep raising in the Eastern States is the damage done by sheep-killing dogs. Practical protection may be had in this system of farming by making the outside fence dogproof.<sup>6</sup> The construction of a fence of this sort, although practically impossible on lands generally used as sheep pastures, is easily accomplished with little additional expense in level-lying lands.

#### DISTRIBUTION OF LABOR.

Labor is one of the principal problems in carrying on many agricultural projects. It is necessary for the farmer to arrange his work so that he will be able to give constant employment to all his men.

<sup>6</sup> See Figure 29, Farmers' Bulletin 810, "Equipment for Farm Sheep Raising."

Specialized sheep farming offers the advantage of more even distribution of labor throughout the year than most other forms of specialized farming. There is no particular rush season, as the lambing season is over before the land is ready for spring planting. Other plantings are necessarily made from time to time throughout the summer in order that fresh pasturage may be available at all times. Such harvesting as must be done comes at different times throughout the year when feed is available for cutting.

Figure 6 shows a model farm plan for specialized sheep raising, and indicates a practical rotation of crops for each field for Central Atlantic and Corn-Belt States.

### SUMMARY.

Sheep can be successfully and economically raised with temporary pastures.

Numerous forage crops may be used for these pastures. The kinds used should depend largely upon the soil and climatic conditions in which they are to be grown.

More sheep can be raised per acre on temporary pastures than could be raised on permanent pastures on soils of equal fertility.

Pasturing sheep on annual crops makes it possible to rotate pastures more frequently and thus lessen the danger of infection by stomach worms and other internal parasites.

Temporary pastures, because they furnish an abundance of succulent green feed at all times, tend to increase the milk flow and make it more even throughout the lactation period.

Wheat, where it can be successfully grown, provides better winter and early spring pasture for sheep than rye.

Oats and field peas together make an excellent spring pasture for sheep.

On rather fertile land rape is the most economical forage for sheep.

Soy beans make one of the best temporary pasture crops for sheep where the soil is thin. This crop can be pastured from July until the first frost.

Either alfalfa or sweet clover makes a very satisfactory pasture for sheep, but care should be used to prevent bloat.

Pasturing sheep on small areas intensively cultivated makes it practicable to protect sheep from dogs by the use of a dogproof fence.

Specialized sheep farming provides an equal distribution of labor throughout the year, thus eliminating one of the principal farm problems.